Certified
Naval Battle Groups

Microwave Tube Industry Stewardship and the Application of Solid State Technology

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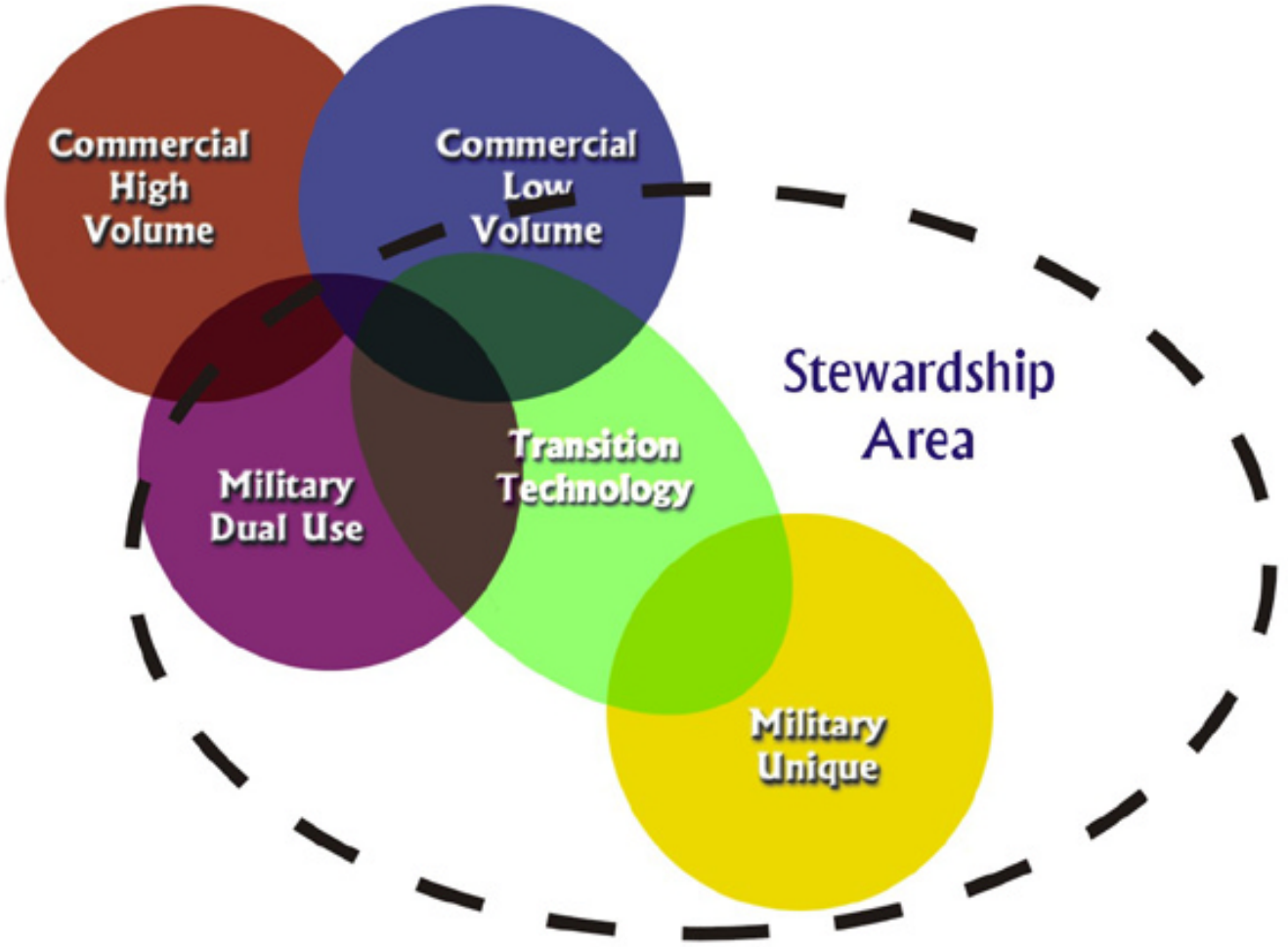
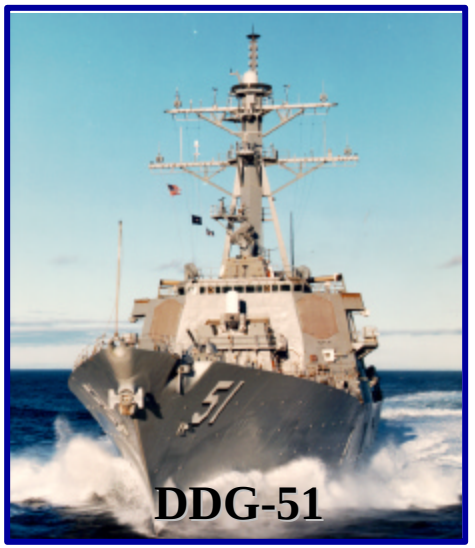
Introduction

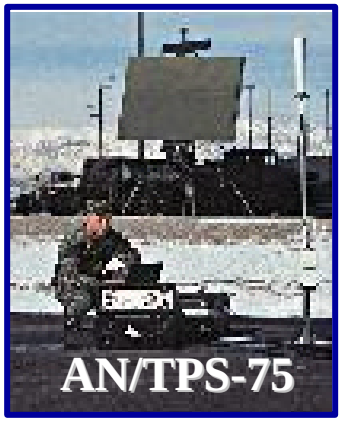
- Background
  * Vacuum Electronic Devices (VED's) are critical to the DOD and will be the heart of DOD combat systems for the next 20-25 years
- Supporting Today's Warfighter
  * Stewardship of VED's
- Meeting the needs of Tomorrow's Warfighter
  * Solid State technology in maturing and beginning to meet DOD power and frequency requirements

Stewardship Applys When_____



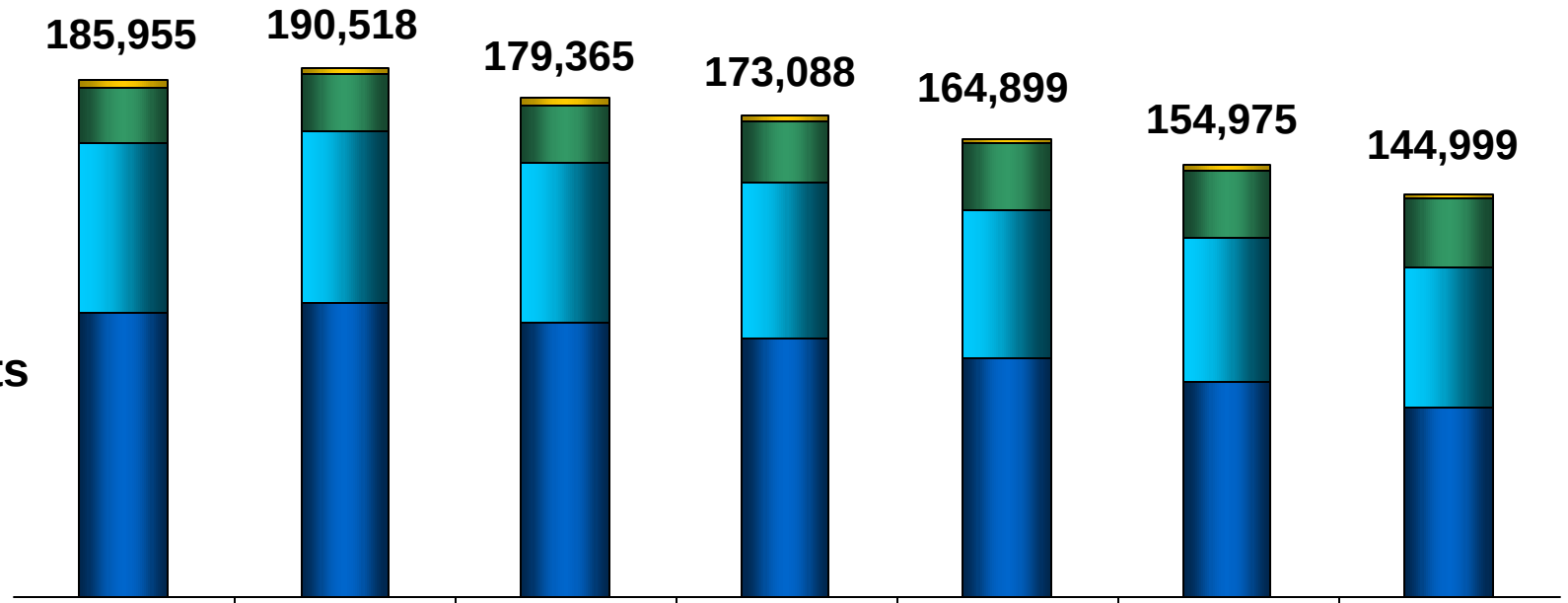
VED's in the DoD





F-15 Strike Eagle

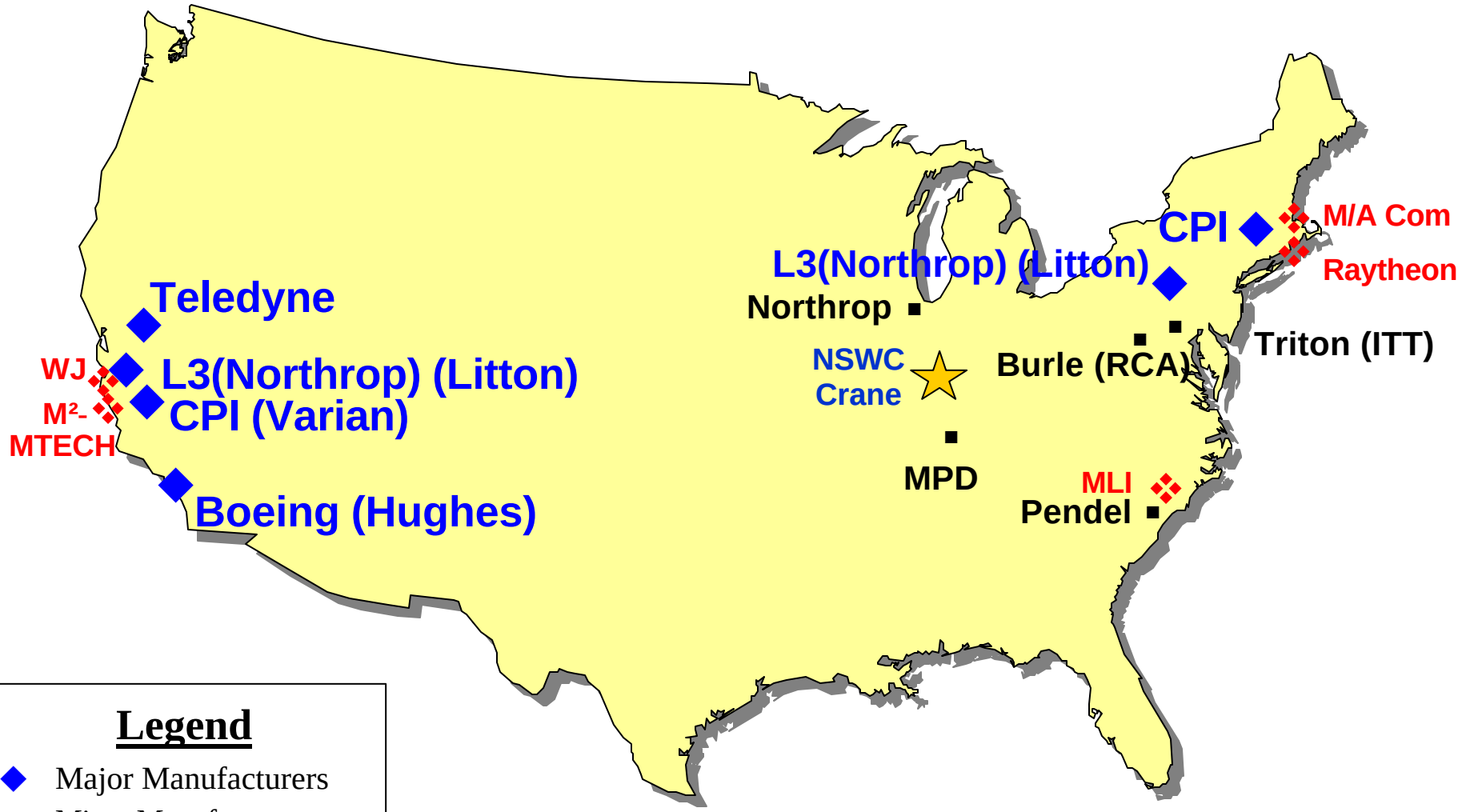
DoD - Operating VED Sockets



	2000	2005	2010	2015	2020	2025	2030
Marines	2447	2371	2242	1950	1865	1715	1570
Army	20160	20499	21218	22087	23150	23677	24824
Air Force	61447	62026	57510	55958	53467	52217	50351
Navy	101901	105622	98395	93093	86417	77366	68254

As of 10/31/00

VED Manufacturers: "Then & Now"

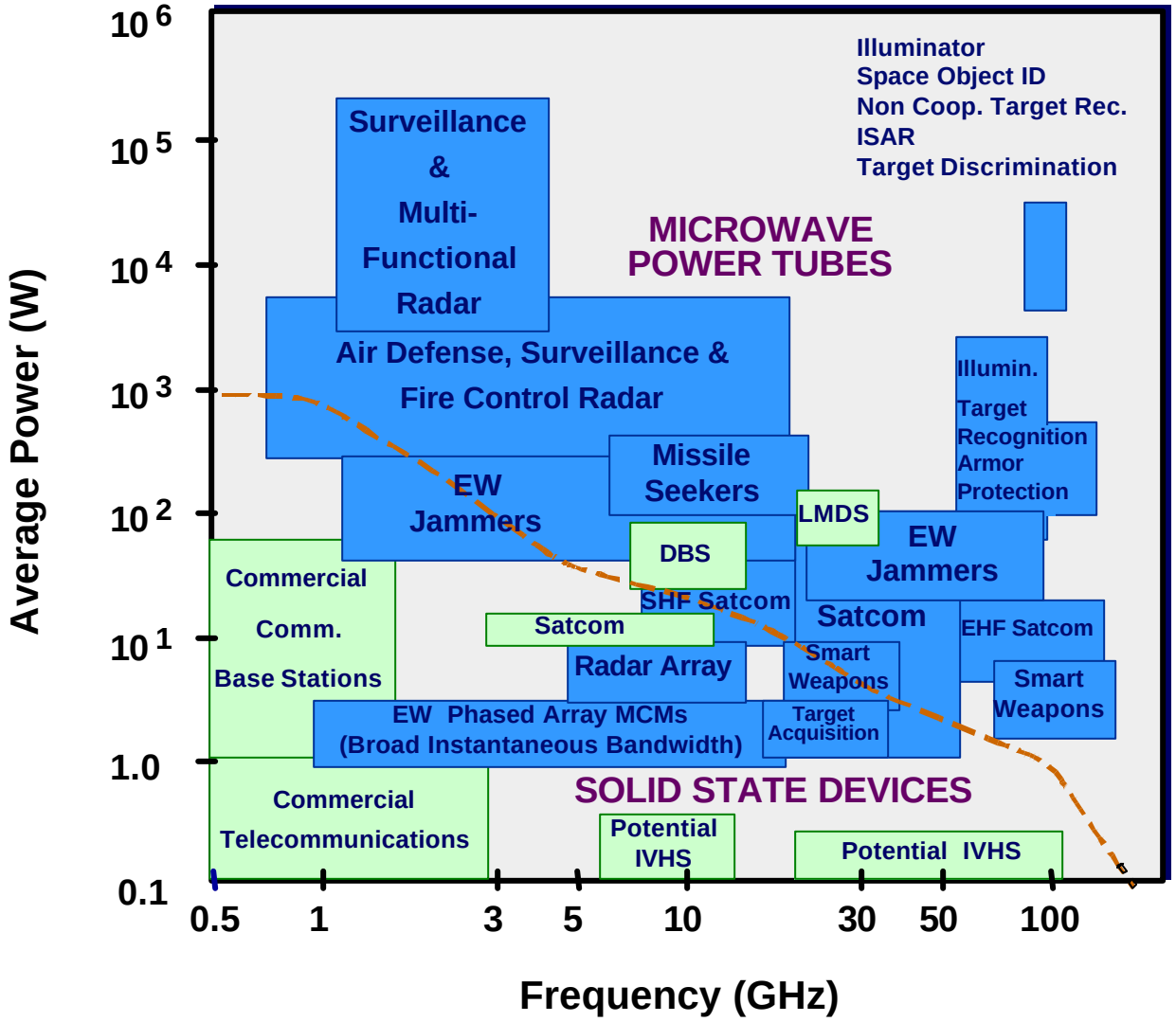


Legend

- ◆ Major Manufacturers
- ■ Minor Manufacturers
- ❖ Casualties (last 10 years)

Viewed as a Component Supplier

Commercial vs. Military Use of Microwave Devices



- Military
- Commercial

❖The Overlap of Commercial and Defense Markets is <20%

❖Most DoD needs above 1 GHz are not met by COTS

The Role of a DoD Steward

Preserve DoD ability to obtain an affordable product or process which is critical to the Nation's Defense

- Stewardship is Required When
  - * Products or processes have limited commercial interest and support
  - * On-shore sources are non-existent or insufficient
  - * Driven by unique Military logistics requirements

U.S Navy Stewardship

- DoD VE Executive Agent Assigned to Navy 02 May 1997
- Examples of Stewardship Roles

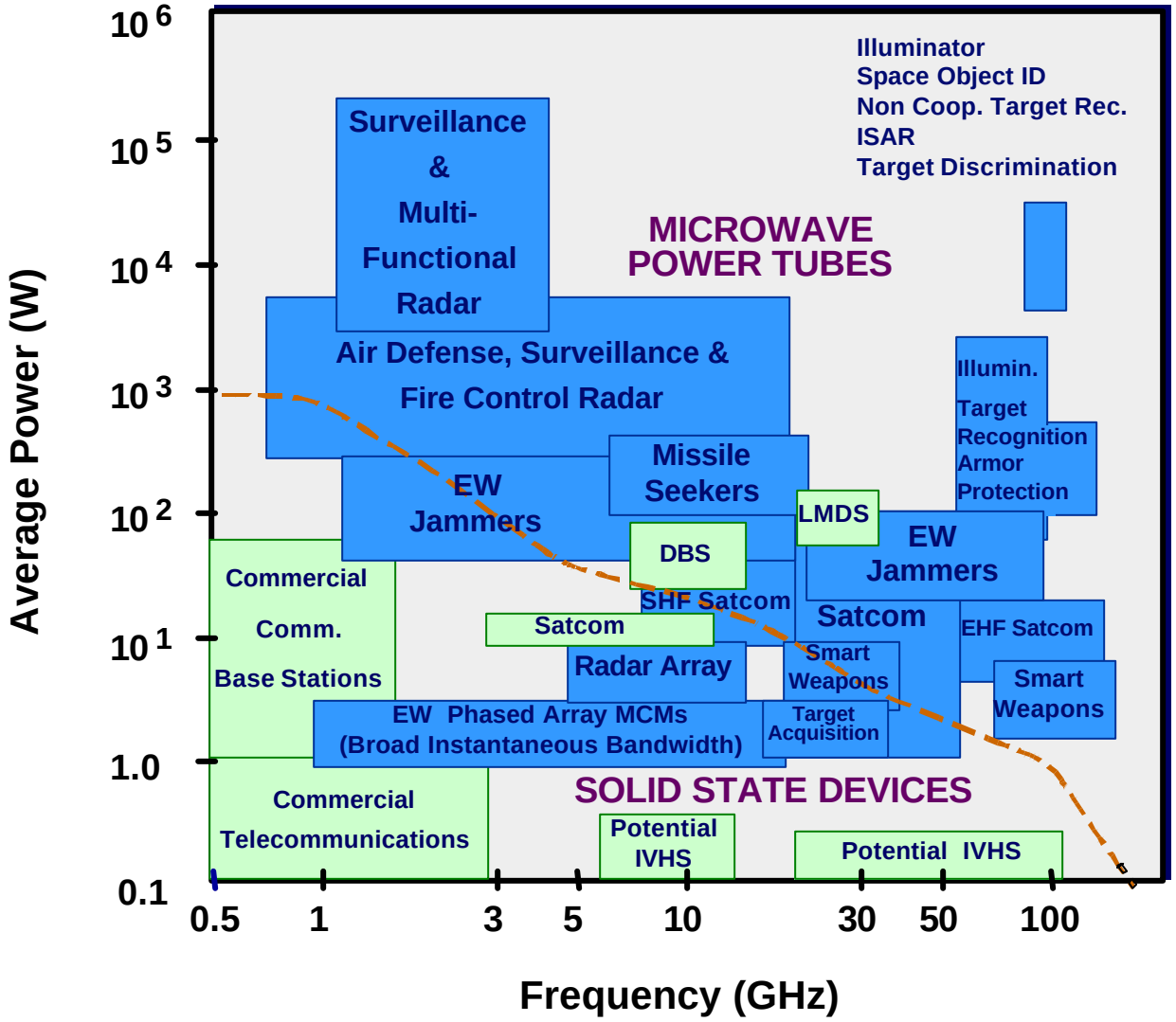
  * Facilitate communication and knowledge sharing among industry, academia and military users of products and processes

  * Maintain critical capabilities and knowledge as required
    - Test & evaluation
    - Logistics
    - Limited manufacturing & repair

  * Identify and assure support of technologies underlying the product or process

  * Serve as advocate for programs targeted at maintaining the viability of the product or process

Solid State Technology Insertion



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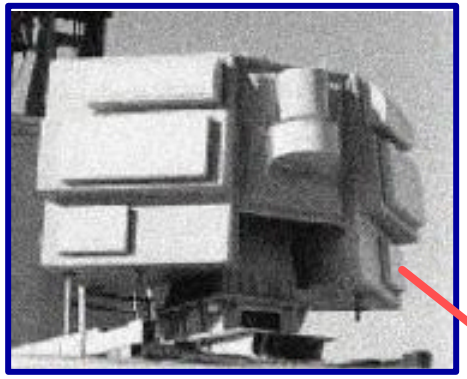
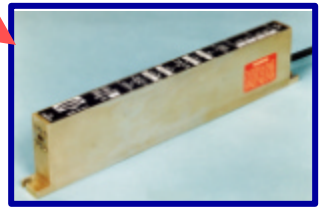
AN/SLQ-32(v)3 Upgrades



- Replace TWTA's with hybrid SS amplifiers
- Replace High Voltage Distribution Unit with Solid State Switch device unit.
- No modifications to existing architecture

Current Progress

- 1st article hybrid TWTA testing I/P
- Low Power SS unit development funded
- Push to Fleet in FY04

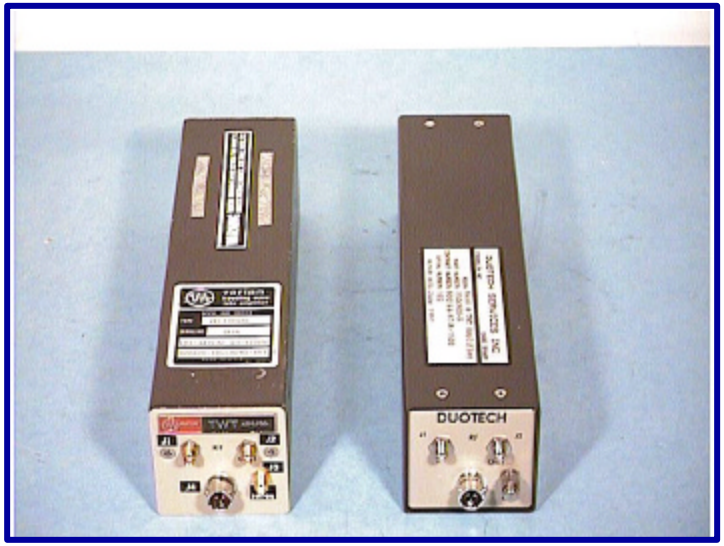


Benefits

- Lower Noise
- Reduced Obsolescence
- Comparable Cost

AN/ALQ-99 Band 8/9 Local Oscillator

- Current TWTA Repair costs: >$30K
- Crane developed specs for SS replacement. Production contracted to private sector.
  - Form/Fit/Function replacement
  - NRE cost: $50K for 2 prototypes
  - Unit Cost: $10K
- Replaced, as required, beginning early CY02.
- Current Demand: 8/QTR



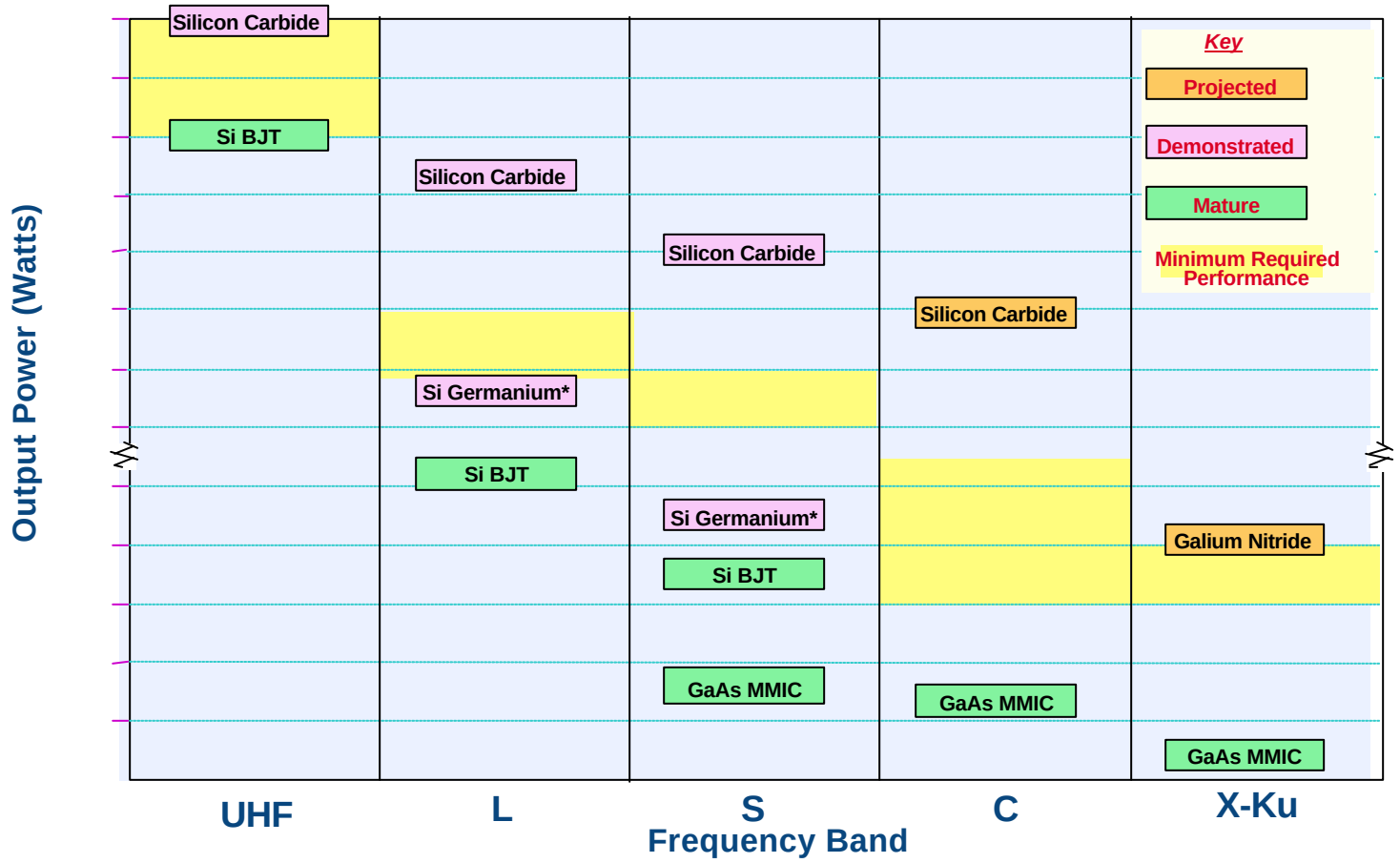
TWTA used on AN/ALQ-99 Band 8/9 LO

•Better Performance

•Lower Cost

•Readily Available

Technology Performance Gap*



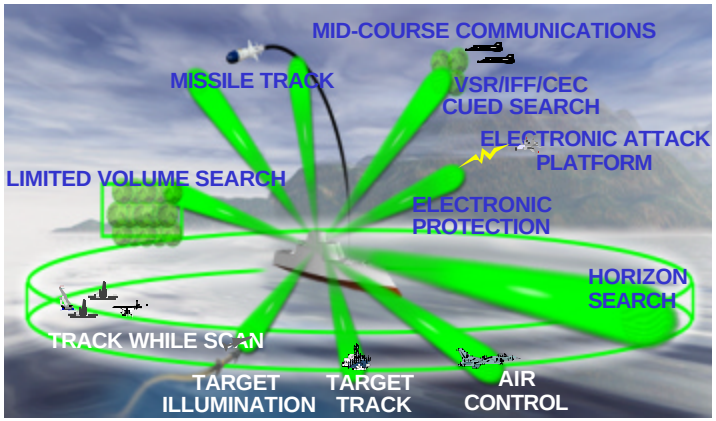
Existing Components Do Not Support Future Radar and Seeker Requirements...WBG Components Are A Key Enabling Technology

•Dr. M. Kumar

Lockheed Martin

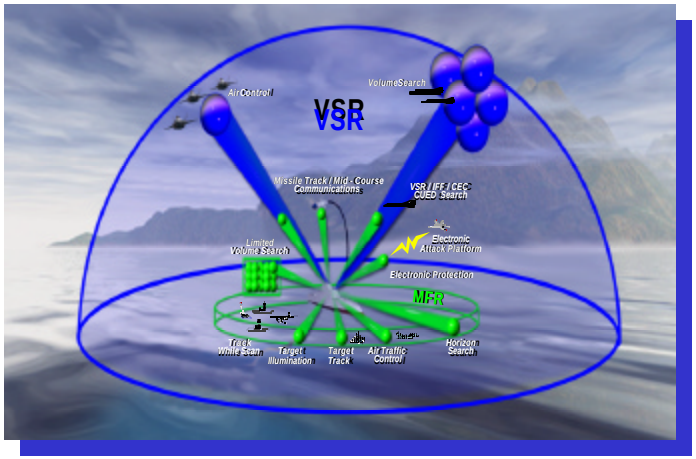
9/02

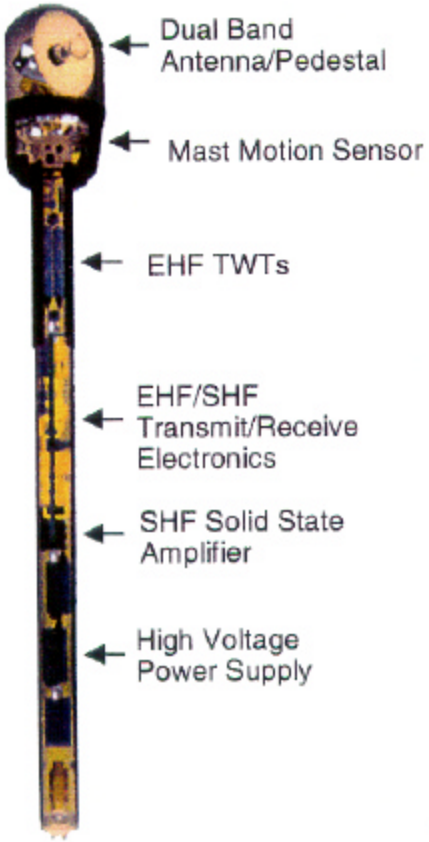
Emerging Systems



Multi-Function RADAR (MFR) Characteristics

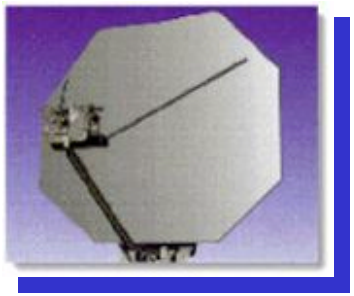
Volume Search RADAR (VSR) Characteristics





HDR Submarine SATCOM Transmitter

SPS-73 Radar



AN/SPQ-9B

ALE-50 Towed Decoy

Summary

- VED's are critical across the DOD and will be the heart of DOD weapons for the next 20-25 years.
- Solid State technology is maturing and beginning to meet DOD power and frequency requirements.

Two Challenges

- Maintain viability existing VED-based systems
- Continue to work with industry to integrate Solid State technology as it matures.


NAVSEA
CRANE
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